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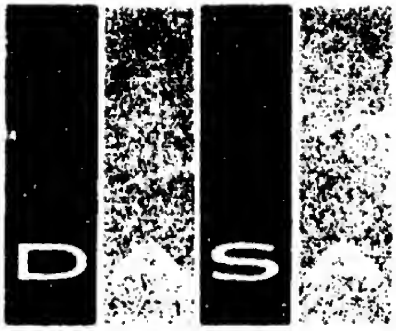

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DUNHAM: This was an analogous situation to what was seen in the Army with malaria. They had little malaria units. Every military group had a team, but the commanding officers had had no experience with malaria. They didn't see anything and this poor little malaria unit would cool its heels until they had a great many cases of malaria. Then they would be told to scurry around. I think it's just human nature.

Langham, you seem to be restless there. Would you have anything to add? You're the authority on Dog Shot, by the way, because some of your dogs were there, weren't they?

LANGHAM: Yes, they were. Merril's story to me is almost incredible.

FREMONT-SMITH: That's like life! [Laughter]

LANGHAM: Fallout was predicted for the Trinity test in 1944 by the bomb phenologists, Hershfelder and McGee. Stafford Warren mounted evacuation teams and monitoring teams to cover the potential fallout area. We didn't have to evacuate anybody; we almost did. The arbitrary limit chosen for evacuation was an infinite life-time dose of 50 r. One family approached this limit, and there was much debate as to whether we should evacuate them or not. They weren't evacuated.

WYCKOFF: What happened to the cattle?

LANGHAM: Cattle were burned by fallout at Trinity, and we had experience with fallout at Bikini where there was fallout on ships. I can't imagine anyone thinking that there wouldn't be fallout involved with weapons tests. I still to this day want to attribute the 1954 accident to just a little bit of misconception on the part of the meteorologists. I can't imagine at that time that one would think there wouldn't be a fallout problem with that device if a populated area was downwind from the detonation. So they had trouble, and I can't understand why anyone would have expected otherwise.

FREMONT-SMITH: You know what happens on misunderstanding. It seems to me this is one of the things we have to face. I will give you a little episode. During World War I we had shell shock, a considerable amount of it. It was so reported, and anybody who studied the thing at all knew that we were going to have some kind of equivalent

we were recovering animals from the shot island, we dressed in complete protective clothing including respirators. We looked like men from Mars. We invaded the shot island to get our animals, and the plan was that when we came back to our home island with the animals we wouid strip off all our clothes and throw them into a box on the beach and walk up to the quarters in the nude. On the shct island, we could hardly get a meter reading anywhere. In the meantime, a sheer in the wind had brought the fallout right over our home island. When we returned to base camp with our animals, we took off all our clothes and walked in the nude through a hundred times as much radioactivity as occurred on the shot island! [Laughter]

FREMONT-SMITH: That's a wonderful story.

TAYLOR: I would like to interject something that you challenged, Staff. You said a moment ago, you can't hear it. Apropos of the Dog Shot, fallout was clearly audible. There were little beads of steel from the tower that condensed, and one heard this constant tinkle, tinkle of steel from the tower hitting the aluminum roofs and then rolling down the gutters and piling up in little piles on the ground. The thing which I've never understood, which has some psychological significance, I suppose, is that the radiation monitoring teams, pairs of people with a Zeuss meter, would find one of these little piles and you just heard from them lots of expressions of various kinds of bad language about 10 r per hour, 40 r per hour, a few r per hour and a sort of disbelief. The upshot was that everybody kept wandering around. According to a Zeuss meter that Herb York* had set up in one of the buildings just to have people file past to see what their reading was, my own hair was reading 2 r per hour after a shower. Well, I got worried, along with a number of other people. But somehow there was an air of unreality about the whole thing. There was a big discussion about whether we would have a movie that night or not, and somehow they, and no one seemed to know who "they" were, had decided that the movie was all right.

Somehow I've never understood how that could have happened, in view of all the literature that was available for years before Greenhouse on fallout and on hcw large areas could be covered with very intense radiation. No one seemed to want to believe what was happening.

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* Herbert F. York, then at the University of California.

EISENBUD: Well, apparently I'm not too good on the dates. I flew straight through. In those days it was about 40 hours. I think I got there around the 19th or 20th, 48 hours later. There was a lot of confusion everywhere. You've got to remember that 1954 was the end of a very bad time for the Japanese. It was nine years post-war but the upturn really hadn't begun. They were two years past the Peace Treaty. The scientific community wasn't organized. The Japanese had no instruments, not even Geiger counters. Also, there was a lot of jockeying for position among the Japanese.

Well, I went very innocently myself. Actually I was all packed for going into Eniwetok anyway, and within an hour I changed my plans and left for Japan and had no contact with anybody until I got there. When I got there, there must have been a thousand people with signs at the airport, and I wondered who the big shot aboard was; I found out it was I! [Laughter] Somehow or other, through this telegram, they had word that I was coming and were picketing. Some American MPs had been permitted to come to escort me into a limousine, which was right at the foot of the ramp.

Well, this of itself was very bad. A number of Japanese had come out to the airport to meet me, some of whom I knew quite well, but I wasn't permitted to see them. They had waited for hours, and I was put into the limousine and whisked out to the Embassy so that I could brief the staff. So that was the beginning.

The Japanese had no way of getting the basic information that they needed. They knew nothing about bombs; there was no way in which they could get, for example, information on the fission products that you would expect, the debris, and what kind of activation products would be present. On the other hand, the next morning one of the first people I saw was Doctor Kimura, who was one of the first radiochemists who actually had been a student of radioactivity, and who in 1945 was the one who had taken soil samples from Nagasaki and Hiroshima and concluded that there was plutonium in the Nagasaki bomb, based on his analysis and what he read in the newspapers.

By the time I talked with Kimura the next morning, he had already analyzed the debris and had detected uranium-237, which led him to the conclusion that there must have been an n2n reaction which involved the fast fission of uranium-238. I mention this because at that time this was a very sensitive fact in our weaponeering and here I was sitting with a man who had deduced something in a couple of days that was known to very few people in the United States. So you

see the situation I was in, trying to be helpful and at the same time trying to protect information that other people thought should be held secure.

I think that at that particular point in time the whole difficulty with the Japanese, as far as the public relations problem was concerned, could have been solved. The main thing that the Japanese wanted was a statement that our government was sorry.

DUNHAM: Didn't one of the fellows get involved with the accusation as to whether or not they were within the exclusion area, so that it was a long time before the powers in Washington would agree that it was perfectly possible that it wasn't within the exclusion area?

EISENBUD: That's right. I think it was clear, and this was reported, that they really couldn't tell, and that the navigation equipment they had wasn't very sophisticated. The log looked authentic but they could have been five or ten miles on one side or the other.

One thing that impressed me through this stage, which I've often remembered as other crises developed and as I think about our people that were participating, is how tired you get. I flew straight through in 40 hours in a very excited condition wondering what it was going to be like when I got there. I arrived at two o'clock in the morning of, I guess, the end of the second day. I was whisked to the Embassy at two in the morning and stayed in conference for about 2 hours. I went home and got into bed for the first time in 3 nights; I had 2 hours sleep and then went off for the first conference with the Japanese, and met all day. I made a point of getting to bed early that night, but with the 12-hour difference in time, John Bugher was just about ready to telephone me along about ten o'clock at night, and this pattern kept up for 4 or 5 days. I was really at the verge of exhaustion, but I had to make a decision.

FREMONT-SMITH: Yes, which is very difficult to do in that state.

EISENBUD: Yes. And I don't know whether or not I made the right decision; I mean, somebody else would have to evaluate this. But when I think of the Cuban crisis and the Berlin crisis, and of the very few people who were at the center of this thing and who had to think despite the fact that they couldn't get their rest. I think it's a problem that someday the government is going to have to deal with. Chuck, you may have been in the middle of this many times.

DONALDSON: As Merril said, some were. It was not uniform and it was the type of contamination which we had never encountered and have not encountered in all the years working in the Pacific. It was not absorbed, but adsorbed radiation, which came from dragging the fish across the deck. This external superficial contamination or surface contamination was easy to measure with the usual radiation instruments, while the internal selectively absorbed radionuclides, so characteristic in the subsequent samples of the March 1, 1954 test, were not found in the tissues of these tuna. You have two types of problems as far as radiation contamination is concerned.

TAYLOR: With these fishes?

DONALDSON: They stopped fishing and began picking up their lines. Therefore, you don't know just how much radioactivity came from contamination in the water and how much was from actual fall-out on the deck.

BUSTAD: With regard to your second statement relative to the crew being in the wrong position, in Lapp's book he states that the crew felt they had been detected by the American authorities. I assume he obtained this information from the crew, didn't he? I mean, this feeling?

EISENBUD: Yes. Well, they thought they were probably going to end up in jail again. You see, they had been in jail probably two months or so.

DUNHAM: They had been in jail in Indonesia.

EISENBUD: Yes, for poaching.

Well, what happened next? Maybe, Lauren, you have better information than I do on this. It's my recollection that the American shipping companies took the position that they would not accept any fish for transport to the United States that was not certified by the American Government as being acceptable for entry into the port when it arrived on the West Coast, and this is what caused the great tuna panic of 1954.

DONALDSON: That was part of it.

EISENBUD: Part of it? What was the other part?

ROOT: Yes. This had a greater political effect because Hiroshima and Nagasaki were in the context of war—to that extent understandable. This was completely unwarranted—and the U.S. reactions seemed so callous—not even, I was told repeatedly, saying we were sorry, or taking any responsibility.

Furthermore, it played into a tense political situation. The fishermen came back two days before the Diet was to ratify MSA.

DUNHAM: What was the MSA?

ROOT: Mutual Security Agreement—after Korea. It was terribly important that Japan become a responsible member of the organization. The Yoshida cabinet was entirely favorable to the U.S. and it looked as if there would not be too much opposition. Then the fishermen arrived. Demonstrations flared up everywhere. You had the trade unions, three million strong, protesting. The cabinet tried to counteract the anti-American feeling but a tidal wave of anger inundated the country. It was just diminishing when Koboyama died. This was portrayed as a radiation death.

FREMONT-SMITH: This is the fisherman that had the transfusion and the hepatitis?

ROOT: Yes. Japanese doctors give very small blood transfusions, and Koboyama needed a great many.

Timing in Europe was unfortunate, too. At the end of January 1954 Secretary Dulles made his "massive deterrent" speech announcing a radical change in our policy; we had decided that the atomic weapon as a massive deterrent was our shortest cut to peace. In February, Vice-President Nixon stated that we were tired of being dictated to as to time and place, and were going to call our own shots from now on. The NATO countries, Great Britain and the others, were terribly concerned about this. As staging areas they expected any such momentous decisions to be the subject of consultations at least.

To cap the political confusion and dismay in March, came news of the heavy fallout from the "Bravo" Shot. And where did the press get this information? From Tokyo. As you know Tokyo is a very large city. It has representatives from the press of every major country in the world. Suddenly the whole of Europe was flooded with grim headlines—and no explanation from the United States. The first

explanations, when they came, made us look even worse. "The skin injuries might be lye burns—from the unslaked lime of the coral." Dr. Tsuzuki went on the air internationally—a 15-minute speech translated into all Western languages—to describe the injuries. He said it was ironic to tell him that radiation burns might be lye burns, when he had worked all his professional life with radiation, and had been the first to go into Hiroshima. He made a few unpalatable remarks about the ABCC, and about the Americans using the Japanese as guinea pigs.

There was much misconception about the purpose of the ABCC among the Japanese. They did not understand that the ABCC was a research organization and not allowed to treat patients, as that was against Japanese medical policy. For years resentment had been building up because radiation victims would go to the ABCC, be examined and tested for days—and then sent away without consistent treatment. The idea spread, fanned by anti-American interests, that they were being used as guinea pigs to further American science. I was told that this was one reason the fishermen and their doctors refused to permit examination by American radiation experts and doctors.

In England, Prime Minister Churchill was grilled for 7 hours by Parliament with the Members insisting he call the American Government to account, demand an explanation—and the Prime Minister protesting, "I will get only a rebuff. I think we ought to have an explanation but we can't demand it."

The image of the scientist underwent a sad change—and I think this is not simply a literary curiosity. Before 1954, the prototype was Pasteur, Einstein, dedicated men working for human good. Otherwise they were "mad scientists." Simultaneously, as if on cue, after March 1954, scientists became "sorcerer's apprentices" in every European language—English, German, French. "Mad scientists" dropped out of the literature. All scientists are now in league with the devil.

FREMONT-SMITH: They are all mad. Very interesting.

ROOT: I hope I haven't taken too much time. This may be entirely irrelevant.

DUNHAM: Yes.

UPTON: I wonder if you would like to have them offer comments?

DUNHAM: Yes. Dr. Schull!

SCHULL: I would like to make two observations which I believe are pertinent before I describe the situation in Japan in 1954 as I saw it. First, we should bear in mind that the Japanese are uncommonly health-conscious, and to an extent that some observers feel borders on hypochondria. The face mask, for example, is a ubiquitous part of the winter scene, or at least was in those years.

DUNHAM: They can't outdo us.

SCHULL: Possibly not. The second observation is that there seems to be no history of responsible journalism in Japan. The three large presses, Asahi, Yomiuri, and Mainichi are in a perpetual circulation war and they are generally prepared to take advantage of any situation which might enhance their status vis-a-vis one another. These two factors, when put together, can seriously restrict the relevance of the Japanese experience for a nation with different journalistic traditions.

As to my experiences in 1954, the story begins in the summer of 1953 when there was convened in Ann Arbor a small informal group whose function was to decide whether or not the clinical portion of the genetic studies then under way in Japan should continue. It was our task to determine whether enough additional information could be gained to warrant further investment of manpower and money. The consensus was that this was unlikely; the basis for this conclusion rested largely on the knowledge that many of the exposed individuals were reaching ages at which no further reproduction was to be expected, and hence continued study would merely increase the "control" observations which were already much more numerous than the "experimental." There seemed, therefore, no particularly strong reason to continue the clinical portion of the studies, and I had gone to Japan shortly after the first of the year in 1954 to terminate that segment of the genetics program.

Shortly after I arrived, there was held in Tokyo a review of ABCC's research activities; this meeting was attended by most of ABCC's departmental chiefs and a substantial number of Japanese scientists.

There was still manifested, I believe, some of the hostility which had arisen in certain Japanese scientific circles in the years immediately after the war. Most of the physicians with ABCC, and, in fact, most of the American physicians who went to Japan couldn't communicate effectively with their Japanese colleagues, few of whom spoke English. The language of medicine in Japan has been German, and only recently has English come to play a prominent role in the exchange of medical information. It was not easy under circumstances such as these to establish rapport. The situation with respect to genetics was quite different. This was ascribable to a number of largely fortuitous happenings. First, there was a firmer body of experimental information from which to attempt extrapolations to Hiroshima and Nagasaki, and even to the members of the crew of the Fukuryu Maru. Second, many of the Japanese geneticists of stature at that time had been trained either in the United States or in Europe, and as a consequence we often spoke a common language, namely, English. Japanese geneticists, in general, strongly supported ABCC's genetics program; whereas the endorsement that was being given to medicine, for example, was of a more qualified nature. The absence of a strong endorsement encouraged opportunists and opportunism, and the Fukuryu Maru incident was replete with both.

The emotional climate that was created in Japan when word reached there of the Fukuryu Maru was really a very strange and almost unbelievable one. Rightly or wrongly, I'm inclined to ascribe it in large part to the "devil's brew" to which I have previously referred. The newspapers seized upon the incident and began a drumfire of daily accounts which almost seemed intentionally designed to heighten anxieties, real or fancied. The Japanese government as well as our own had effectively lost control of the situation. The newspapers had "grabbed the ball and were running with it."

I can recall quite vividly some of the headlines which appeared. There was one, for example, in the Osaka English-language Mainichi; the headline said; "WBC counts of fish-eaters rise." It appeared shortly after it had been announced that radioactively contaminated fish had accidentally reached the Osaka market, and that some had been inadvertently sold. A few individuals who had presumably eaten the fish were being studied by local authorities. This headline accompanied a report of their work which, by the way, was unobjectionable. They had carefully indicated that numerous factors could produce a rise in white blood cells, including upper respiratory infections so common at that time of year; they further stated that on this account one could not conclude that the elevation was necessarily due to the

DUNHAM: I think it points up again that it isn't particularly right because it's radiation. This is just something simply seized on.

WARREN: This is part of the cold war.

DUNHAM: Not the government people or most of the university people or most of the scientists. The fallout they've had from some of the Chinese tests has not been played up very much in the Japanese press.

TAYLOR: I think the mystique is right here at home, typified by a comment that President Kennedy made to Jerry Wiesner when they sitting together in the White House and it was raining out. Kennedy asked Wiesner whether there was fallout in the rain that was falling on the White House lawn, and Wiesner said, "Yes, there still is." This was an intense emotional experience for the President, to see rain with fallout on the outside; nothing connected with anything in any way quantitative at all. As far as he was concerned, that rain that was falling outside was bad.

ROOT: I think it's a little dangerous to equate radiation with cranberries, though, because we know what radiation can do. There should be a legitimate and respected fear of it.

DUNHAM: I'm not saying it shouldn't be respected, but it happens in certain areas where the psychological seed has already fallen.

ROOT: I think the psychological seed germinates and flourishes because of the ultimate lethal threat.

DUNHAM: The pesticides are lethal. So is radiation.

WARREN: Not everybody buys cranberries and couldn't care less, but everybody is subjected more or less to the fallout.

DUNHAM: So is Vitamin A. It's toxic, too.

MILLET: This, I think brings up another point perhaps. We've been talking about our dissatisfaction with leaders for not giving us the information that we ought to have. I think we're getting into the area of the mystique of the leader in this country, and perhaps one of the great problems hasn't been touched upon sufficiently yet, which is that our leaders are not sufficiently well educated to know what to

FREMONT-SMITH: But, you see, they say the only way they can serve the country, which they know they can do, is to get re-elected, so the most important thing to save the world is to get re-elected.

WARREN: I'm reminded of the fact that the Japanese did some shadow boxing on this. Their ambassador was in Mr. Hull's office when they attacked Pearl Harbor. The Japanese ambassador could very well have committed hari-kari in the corridor of Mr. Hull's office because he lost face by this act of his government which used him as a pawn for deceiving.

DUNHAM: I don't know. Do we have any experience other than with coral fluff which apparently is quite readily visible even to the Rongerik people?

EISENBUD: Well, Chuck, if it's going to do a lot of harm, it has to fall out.

DUNHAM: Eventually fall.

EISENBUD: It has to fall out within a few hours. In order to fall out within a few hours, the particles would have to be greater than about 20 or 30 microns and they would have to exist in large enough numbers so that I think you could see them.

TAYLOR: That makes it easier because the total yield of the stockpile in the United States is going down. If you put it 20 years ahead, it may actually be simple.

DUNHAM: I think we should look to the comics and the science fiction people for our basic assumptions then.

EISENBUD: I've always felt that the emphasis on disarmament was in the wrong place. I think that we spent too much time talking about the cessation of weapons testing and nuclear weapons development arrest when we should have been looking at methods of weapons delivery and limiting aircraft size and missile delivery, because even with the present methods of delivery and the projected methods of delivery we do a pretty good job with Hiroshima type bombs.

TAYLOR: That's why it's going down, not because of arms control.